*Halo phenomena observed during May, 1919*—Continued.

| Station. | Date. | Colors.† | Degree of brightness. | Clouds. Amt. | Kind. | Direction. | Station pressure. | Precipitation. Last previous ended. | First subsequent began. |
|---|---|---|---|---|---|---|---|---|---|
| Tatoosh Island, Wash. (continued) | 15 | W | Dim | 6 | A. St. | s. | Falling | 1:55 p. m., 15th | 4:40 p. m., 15th. |
| | | | | 2 | Cu. | s. | | | |
| | 16 | O | Dim | 7 | A. St. | s. | Falling | 7:40 a. m., 16th | 7:40 a. m., 17th. |
| | | | | 2 | St. | s. | | | |
| | 20 | | Dim | 3 | Ci. St. | s. | Falling | 8:30 a. m., 19th | D. N. a., 22d. |
| | | | | 1 | Ci. Cu. | w. | | | |
| | 20 | R. O. Y. G. B. V. W. | Bright | 4 | Ci. St. | s. | | | |
| | 20 | R. O. Y. G. B. V. W. | Brilliant | 4 | Ci. St. | s. | | | |
| | 20 | R. Y. B | Brilliant | | | | | | |
| | 20 | R. O. Y. B | Bright | 3 | Ci. | w. | Falling | 8:30 a. m., 19th | D. N. a., 22nd. |
| | 20 | W | Dim | 2 | Ci. | w. | | | |
| | 21 | | Dim | 2 | Ci. | sw. | Falling | 8:30 a. m., 19th | D. N. a., 22nd. |
| | 22 | R. O. Y. G. B. V. | Bright | 4 | A. St. | w. | Rising | D. N. a., 22nd | 3:40 a. m., 24th. |
| | | | | 5 | St. | nw. | | | |
| | 22 | R. V. W | Dim | 5 | Ci. St. | w. | | | |
| | | | | 2 | St. | nw. | | | |
| | 22 | R. O. G. V | Brilliant | Few. | A. St. | sw. | | | |
| | | | | 6 | St. | sw. | | | |
| | 22 | Y | Dim | 4 | A. St. | w. | | | |
| | | | | 4 | St. | nw. | | | |
| | 23 | R. O. Y. G. B. V. | Bright | 3 | Ci. | w. | Rising | D. N. a., 22nd | 3:40 a. m., 24th. |
| | | | | 1 | St. Cu. | w. | | | |
| | 23 | R. O. Y. G. B. V. W. | Bright | 8 | Ci. St. | sw. | | | |
| | 23 | R. O. Y. G. B. V. W. | Bright | | | | | | |
| | 23 | Y | Dim | | | | | | |
| | 23 | Y | Dim | | | | | | |
| | 23 | R. B | Dim | 7 | Ci. St. | sw. | | | |
| | 23 | Y | Dim | 10 | A. St. | | | | |
| | 25 | | Dim | 7 | Ci. St. | s. | Rising | 3:25 p. m., 25th | 5:50 a. m., 26th. |
| | | | | 3 | St. | sw. | | | |
| | 26 | R. Y. B | Bright | Few. | Ci. St. | sw. | Rising | 3:25 p. m., 25th | 5:50 a. m., 26th. |
| | | | | 4 | A. Cu. | sw. | | | |
| | 26 | R. B | Bright | Few. | Ci. St. | sw. | | | |
| | | | | 4 | A. Cu. | sw. | | | |
| | 27 | | Dim | Few. | Ci. St. | s. | Falling | 4:30 a. m., 27th | D. N. p., 28th. |
| | | | | Few. | Cu. | | | | |
| York, N. Y.* | 14 | Y. W | Dim | 9 | Ci. St. | w. | Falling | 12:10 p. m., 12th | 2 p. m., 15th. |
| | 15 | R. O. Y. W | Brilliant | 9 | Ci. St. | w. | Stationary | 12:10 p. m., 12th | 2 p. m., 15th. |
| | 16 | Y. W | Bright | 5 | Ci. St. | w. | Falling | 3:40 p. m., 15th | 2 p. m., 16th. |
| | | | | 5 | St. Cu. | sw. | | | |
| | 19 | O. Y. W | Bright | 9 | Ci. St. | w. | Stationary | 9:30 a. m., 17th | 6:30 a. m., 20th. |
| | 19 | R. Y. W | Bright | | | | | | |
| | 19 | Y. W | Dim | | | | | | |
| | 19 | R. O. Y. W | Brilliant | | | | | | |
| | 19 | R. O. G | Bright | 10 | Ci. St. | w. | | | |
| | 19 | R. G | Dim | | | | | | |
| | 24 | O. Y. W | Bright | 4 | Ci. St. | w. | Stationary | 4 p. m., 23rd | 3:40 p. m., 24th. |
| | | | | 2 | A. St. | w. | | | |
| | 24 | O | | | | | | | |

* Same taken at Rochester, N. Y.

† Beginning with part nearest sun or moon. R. red; O. orange; etc.

## NOTES.

### HALOS, TATOOSH ISLAND, WASH., MAY 12–14, 1919.

Unusually well-defined halos and attendant phenomena were observed here on the 12th, 13th, and 14th. Figure 1 shows the unusual variety of forms observed at 8:25 a. m. on the 14th.—*R. C. Mize.*

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### PARHELIC CIRCLE AND HALOS OBSERVED AT LANSING, MICH., MAY 19, 1919.

A partial ordinary 22° halo, first noticed at 9:15 a. m. (90th mer. time), May 19, 1919, was kept under observation, and was noted as becoming complete and bright between 10:15 and 10:30. Then elliptical bulging of the sides indicated the formation of the circumscribed arc, which became well-defined at about 10:50, its presence being proved by the extra series of prismatic colors visible on the bulged sides of the ordinary halo.

At this time another arc appeared, this one quite capable of misleading the observer. It was a circle of whitish color, apparently of the same size as the 22° halo, and overlapping this on the side toward the zenith, in such a manner that the center of each of the two circles seemed to be located on the circumference of the other: it gave the impression of a reflected 22° halo whose edge passed through the sun. Coincidence, however, accounted for the similar size of the two rings, for the whitish upper circle was the complete parhelic circle with the sun at altitude 66° 7′, indicating that its radius was about a degree larger than that of the halo. This measurement was made at 11:00, when it was best in definition, but faint in comparison to the brilliant 22° halos. Its white circumference was studied in vain for a glimpse of "knots" or parhelia. A measurement of the radius of the ordinary halo was made at 11:00: the result being 21.7° from the center of the sun to the red of the ring at this solar altitude (66.7°).

The rapid fading of the parhelic circle and its disappearance by 11:10, while no change in cloud structure or halo brightness was visible, leads to the supposition that the parhelic circle reached the limit for its formation when the sun's altitude approached 68°, when the arc would have been of about 22° radius.

Thickening cirrus forms and altostratus types of cloud blurred and finally eclipsed the ordinary halo, but at intervals until 3:40 p. m. it was observed as partially formed.

Measurements were made by theodolite.—*C. G. Andrus.*